A COMPARISON OF THE PUPAE OF PROMACHUS VERTEBRATUS AND P. FITCHII (DIPTERA).

By J. R. Malloch, Urbana, Ill.

In a recently published paper I presented, along with descriptions of a number of pupæ of Asilidæ, a synoptic key that I thought might prove useful to other students in separating certain pupæ of this family. As it was based upon a very small number of species I considered it highly probable that species belonging to genera unrepresented in my material would run out of the key either because of their lack of characters found in species in the caption to which they seemed to run or because of their disagreement with the descriptions of the species in the text to which they seemed to be allocated by the use of the key. It is therefore highly gratifying to discover that in cases where I have been able to obtain species belonging to the genera dealt with in my previous paper* they invariably are readily assigned to their proper genera by the test of the characters used in the key.

I used as the character for the separation of *Promachus* from other genera the structure of the thoracic spiracles, which in this genus are mere rugose callosities or slight irregular elevations, whereas in the other genera known to me there are invariably distinct, reniform, elevated areas such as are present on the spiracles of the abdomen. I had a large series of specimens of *vertebratus* and considered the structure of the thoracic spiracles constant. I have now obtained from Dr. E. P. Felt examples of pupæ of *fitchii* which agree with those of *vertebratus* in having no reniform elevation. I present herewith a summary of the characters that distinguish the pupæ of the two species before me.

It is necessary to indicate that there is a difference in the pupæ of the sexes in both species as to the form of the apical abdominal segments, which fact is not mentioned in my previous paper. The eighth ventral segment in the female is unarmed in both species, as will be seen by referring to Fig. 2, Plate LXXXII, of my paper, while in the male of both it is armed with spines. The apical segment in the female is noticeably shorter

* Bull. Ill. State Lab. Nat. Hist., Vol. XI, Art. 4, 1915.

than in the male, especially in *fitchii,* which species has a very large hypopygium, the males have also 2 small, round, raised areas transversely situated near the middle of last segment.

In both species of *Promachus* I find, in addition to the spiracles, 2 very distictly elevated rugose areas on the anterior margin of the mesothorax, one on each side of the dorso-median line. In other Asilidæ which I have examined the corresponding areas are not appreciably distinguished either by elevation or rugosity.

The following diagnosis will serve to separate *fitchii* and *vertebratus,* and should be used at caption 9 in my key to the species in the paper already mentioned.

Lateral cephalic process consisting of 3 simple thorns, the upper one strongest; the last 5–8 thorns on lateral extremities of transverse armature of abdominal segments 2–7 stout, flattened, and rather wedge-shaped, their bases fused so that the whole appears as a flap-like process with a deeply serrate posterior margin; eighth ventral abdominal segment of male with 2 thorns; average length 25 mm.
vertebratus.

Lateral cephalic process consisting of 3 thorns, the upper one bifid or sometimes duplicated, so that the process appears quadrispinose, the middle thorn generally strongest; the last 5–6 thorns on lateral extremities of transverse armature of abdominal segments 2–7 very slender, their bases distinctly swollen but not fused; eighth ventral abdominal segment of male with 4 thorns; average length 21 mm.
fitchii.

In addition to the above, *fitchii* differs from *vertebratus* as follows: the upper cephalic thorns are shorter and stouter and the distance between them is greater, at apices exceeding the length of a thorn, whereas in *vertebratus* it is distinctly less than the same; the wart-like protuberance on wing in longitudinal line with the abdominal spiracles is small, rugose, and without an outstanding sharp ridge, while in *vertebratus* it is rather large and has a sharp ridge which is directed slightly upward; the abdominal armature is weaker, especially on lateral areas, where it is not, as in *vertebratus,* noticeably stronger than the armature of the post-spiracular area; the transverse armature of the seventh dorsal segment consists of long thorns only, the small ones that occur between these in *vertebratus* being absent; the apical armature consists of an upwardly directed thorn, much shorter and broader than that in *vertebratus,* and a very small one at its base.

In other respects the species agree closely. The male of *fitchii* which is before me differs from that of *vertebratus,* and also from the female of *fitchii,* in that the wings fall slightly short of the apices of the fore tarsi instead of extending a little beyond them; this may be a variable character and I do not make use of it owing to lack of material for comparison.

I have seen the pupa of another species of *Promachus,* to which I have been unable to assign a species name. It agrees with *vertebratus* in the structure of the lateral cephalic process in having the upper thorn simple, but the upper cephalic thorns are similar to those of *fitchii,* and the lateral process has the thorns shorter than in *vertebratus.* As in the other two species there are only 3 postspiracular thorns on the first abdominal segment; the transverse dorsal armature is very similar to that of *fitchii* in as far as the lateral areas are concerned, but there are no short thorns between the long ones on the seventh dorsal segment, and the apical segment has the upper pair of thorns much swollen at base and ending in rather long sharp points, while the 2 small thorns are stronger and the ventral posterior margin has also 2 small thorns. The length of this species is 14 mm.

Vertebratus and *fitchii* are predaceous on white-grubs, *Phyllophaga* (=*Lachnosterna*) spp., the larval habits of the unidentified species are unknown to me.

I take this opportunity of intimating that the pupa which I described under the name *Promachus milberti* in the paper previously referred to, is correctly identified. I had some doubt about the identity when I wrote the paper as the exuvia were not connected with reared imagines; but since the paper appeared I have had the opportunity of examining a reared specimen which confirms my tentative identification.

OPEROPHTERA (RACHELA) BRUCEATA HULST.

By Richard F. Pearsall, Allaben, N. Y.

In Entomologica Americana, Vol. VI, pp. 123–24, Dr. Geo. D. Hulst describes this species. He says: "The female of this species (I have several before me) is almost entirely wingless.